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INFERTILITY IN CATTLE WITH SPECIAL REFERENCE TO TRICHOMONIASIS *

I. The Clinical Aspect and Diagnosis of Trichomoniasis, with Particular Reference to the Bull

BY

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I am going to talk to you about one particular aspect of infertility only, namely, trichomoniasis; in fact, I shall confine my remarks almost entirely to the clinical side of the disease, with particular reference to the bull. Mr. Pierce is going to deal with the laboratory side of the story, so I will try to avoid stepping into his province, though some degree of repetition will be unavoidable.

This is a purely venereal disease, having no other means of spread than direct sexual contact, and it therefore offers a unique possibility for the application of control measures. But perhaps I should stress straight away that there are exceptions to every rule, and that while for the sake of simplicity I shall make a number of more or less definite statements, you will doubtless know of cases which are apparently in direct contradiction to the usual manifestations of the disease.

Owing to the nature of its spread this is essentially a really serious disease only in areas where communal bulls are widely used, for under these circumstances infection may spread across many parishes in a breeding season, following the introduction of a single infected animal. Though there is always the risk that self-contained herds may become infected by the introduction of a diseased cow or bull, the infection will remain within that herd and no spread will take place to neighbouring farms.

Clinically the disease can present very many aspects, one of the main factors in this being the time for which infection has been present in a herd or area, for almost always symptoms are much more noticeable during the early stages of the exposure of previously clean cows than they are after the disease has been present for a considerable time. So let us consider a clean herd into which a cow infected with trichomoniasis is introduced.

The next step in the story is infection of the bull by service of the infected cow, and one service is quite sufficient for him to catch the disease. Following this infected service the bull almost immediately will commence spreading the disease to the great majority of the animals he serves, though a certain percentage will calve down normally to him throughout. In the females there are four possibilities following an infected service:—

1. Normal pregnancy.

2. Return to service at any period from the normal up to several months. In many of these delayed returns to service it is probable that conception has occurred, followed either by absorption of the foetus, or unobserved abortion.

3. Abortion at practically any stage, but most commonly from the 6th to the 16th week of pregnancy.

It should be noted that the abortion takes place very rapidly and with little or no evidence of its occurrence, and as the foetus may be very small it is frequently the case that the process is not observed at all by the farmer. Abortion is complete, the foetus coming away enclosed in its membranes, and there may be very few accompanying signs of discharge. When the foetus dies but is not aborted, mummification may occur.

4. The development of a pyometritis. This may be either open, in which case there is a chronic discharge, or closed, in which case the uterus may become greatly distended with purulent material.

The discharge which is seen from infected cattle is very variable, the classical one being a clear watery mucoid material containing flakes and streaks of pus—but I will leave Mr. Pierce to deal with this and to give the explanation.

In the early stages of an infection it is usual for the majority of the cows to be affected with one or other of the types of condition mentioned, and in the outbreaks near here a high percentage of abortions has been noted. If the cows are kept long enough, even without any kind of treatment they will develop a certain degree of immunity and many of them ultimately will become pregnant and calve normally, so that in a herd where the disease has been present for many years there may only be a low grade infertility among the adult stock, though the heifers usually tend to show more obvious signs of the disease.

Bulls unfortunately do not show any obvious signs of infection, and in fact the trichomonads can be regarded more as saprophytes than as pathogens in so far as the male is concerned. It is very rare for there to be any preputial discharge, and any reddening and roughening of the membranes covering the penis is far from being diagnostic. It is said that recently infected animals become less inclined for service, but here again this feature is not constant, and anyway there are very many other possible causes.

Diagnosis in the bull, however, can be made with a satisfactory degree of accuracy by means of thorough sheath washing. I propose to describe in some detail the technique that we have adopted.

The apparatus consists of a flutter valve and tubing, attached at the " needle " end to a length of glass tubing—a $\frac{5}{8}$ inch glass test tube, with the bottom cut off and rounded, being satisfactory, though personally I prefer one made from gauge glass tubing as this is very strong and not liable to break during use. The only other requirement is a bottle containing sterile normal saline solution—and this must be made up very carefully to exactly

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0·85 per cent. in glass distilled water, as the trichomonad is very sensitive to changes in osmotic pressure and to the ions of the heavy metals. Approximately 100 ml. of saline is used for an irrigation.

The bull should be tied or preferably held by the head, and it is advisable to have two other assistants. One of these steadies the bull, by pressing firmly into the flank and stifle region with his shoulder; the other helps to manipulate the bottle of saline. Restraint with ropes or hobbles is rarely necessary, and it is felt that any advantage they may offer is more than offset by the excitement produced in the bull.

For a right-handed operator, the bull is approached on the left side as quietly as possible. Firstly, the preputial orifice is thoroughly cleaned with a pledget of cotton wool. Dry wool is usually sufficient, but in cases where there are accumulations of faeces on the preputial hairs the wool should be soaked in normal saline. The apparatus should then be filled with saline by holding up the inverted bottle. The operator or assistant now pinches the tube to retain the solution, and the glass end piece is gently introduced into the prepuce. The left hand now holds the prepuce firmly over the glass so that no leakage occurs, and the saline is allowed to run into the prepuce under the action of gravity. The bottle is held up so that no fluid returns from the prepuce and the operator thoroughly agitates the saline inside the prepuce by vigorous massage with his right hand. Particular care should be taken to ensure that the region of the glans penis is treated thoroughly.

When it is considered that sufficient massage has been given—this usually takes about half a minute—the bottle should be lowered to floor level, and the flutter valve slit held open. The saline now runs back into the bottle, helped by appropriate " milking " of the prepuce.

By this means the prepuce can be irrigated and the washings returned to the bottle without any risk of contamination from the atmosphere or the preputial hairs, and, in fact, in a series of almost 100 irrigations no contaminating protozoa were seen.

The sample may be examined on the farm, but as the illumination for the microscope is of great importance, it is felt that a more satisfactory job can be made by taking the sample straight back to the laboratory. Normally the sample always should be examined within four hours from the time of collection, for motility is the sole criterion of recognition of the trichomonad, and the motility declines steadily with storage.

In the laboratory about 30 ml. of the washing is centrifuged at about 2,000 r.p.m. for two minutes, the supernatant fluid discarded, and the deposits resuspended in the few drops of saline that run back down the tube. Two or three drops are placed on a slide, and a $\frac{7}{8}$ inch cover slip applied. Using the two-third objective, and at least a x10 eyepiece in the microscope, and with curtailed illumination, the slide is now examined systematically, looking for signs of movement. A non-motile trichomonad is indistinguishable from a leucocyte under the low power, so every precaution should be adopted throughout to ensure that no harmful agents are present which might depress activity. Thus all glassware should be perfectly clean, and no contact of the washings with anything metallic should be allowed. A number of preparations should be examined for about half an hour before a negative diagnosis is given.

Where any suspicious movement is seen under the low power, the moving object must be examined carefully under the high-power lens. The diagnostic feature of a trichomonad, apart from the pear shape and the rather typical rotational movement, is the presence of an undulating membrane running the whole length of the body, for none of the other protozoa which might possibly be present in a preputial washing has this feature. Usually it is not possible to make out other morphological details, such as the three anterior flagellae, but after a little practice there is little fear of a mistaken diagnosis.

Altogether 65 bulls were examined by this method, some two or more times, so that the total number of washings carried out was 91. In this series 31 bulls were diagnosed as being infected, 28 of them being found at the first examination. Definite evidence was found in two that they had become infected subsequent to the first examination; they were diagnosed at the first examination after infection. The remaining one was examined five weeks after a probable infected service and found negative, but because of the suspicious circumstances was examined again a week later and this time found positive. Clinical evidence supported the negative diagnosis in the remaining 34 animals.

It is felt that this method of diagnosis is now sufficiently accurate to play an important rôle in the early recognition of an outbreak of trichomoniasis, for the recovery of the parasite from the females can be a very chancy affair owing to the periodic variations in the numbers of the parasites at different phases of the oestral cycle, but Mr. Pierce is dealing with this aspect, as also with the application of the agglutination test in diagnosis.

Control is largely a matter of early diagnosis, followed by measures to prevent the spread of infection by natural mating. Thus a clean bull might be used on heifers and that part of the herd uninfected, but the safest course of all is to use artificial insemination until all the danger of infection has passed. Cows already infected can be treated by irrigation, though this is of problematical value. The main effort should be directed towards the maintenance or establishment of a regular oestral cycle, for the great majority of animals will have thrown off the infection after about the fifth oestral period. Successful conception can occur before infection has been entirely eliminated, which is where A.I is particularly useful, as there is no danger of spread if service is recommended. For all practical purposes a herd may be considered disease free when a normal calf has been obtained from all the animals exposed to the risk of infection, and those which could not be got in calf have been disposed of for slaughter.

Various methods of treatment have been applied to the bull, from topical applications to the penis and prepuce, to systemic injections of chemotherapeutic agents, and some workers have reported a considerable percentage of successes. But for the ordinary commercial animal treatment is not yet worth while, for even in unsuccessful treatments the number of parasites will be so decreased that an apparent cure results for a variable length of time. A rest period of many months, followed by the controlled service of a small number of susceptible animals and a further period of observation will be necessary before a cure can be claimed, and these months of idleness cannot usually be justified economically.

In conclusion, may I say that it is my opinion that if more care was taken in the sale and purchase of barren cows, in the purchase of bulls of breeding age, and if the farmers could be sufficiently educated to the unique opportunities for control that this disease offers, then its total elimination should be practicable in the quite near future.

II. The Host-parasite Relationship between the Female Bovine and *Trichomonas foetus*

BY

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The relationship between the female bovine and the parasite *Trichomonas foetus* presents a complex picture in which generalisation is difficult.

Service by an infected bull will have one of the following sequels: the return of the female to the bull in about three weeks; anoestrus with the development of an open or closed "pyometra"; or pregnancy terminating with an abortion usually between the 4th to 16th week, or with a normal healthy calf. In the last-mentioned instance, although not invariably, the female may have escaped infection entirely.

Recent research has shown that the factors which influence the duration of infection, and fluctuations in the number of parasites within the reproductive tract, are closely related to the physiological state, or oestrous cycle, and the development of specific antibodies. These factors also enable a pattern of infection to be elaborated according to the nature of the reaction of the host to the infecting service (*vide supra*).

In this summary some only of the salient features of assistance to the practitioner will be mentioned. For example, in those animals returning to the bull in about three weeks and thereafter ovulating regularly, the trichomonad may be found immediately prior to the onset of oestrus, and very rarely in oestral or post-oestral mucin. These animals appear to clear themselves of infection within four to five oestral periods. Animals in which the corpus luteum is persistent, frequently those suffering from a "pyometra," may harbour the parasite for many months. Pregnant animals may also retain their infection at least until the fourth month. Discharges from these groups of animals will be worth examining microscopically for the motile trichomonad.

The demonstration of specific antibodies in the vaginal mucin has provided a reasonable explanation for many field observations, although they do not appear to protect the animal from re-infection. Mucin derived from the vagina may be rich in antibody while infection persists in the uterus. If the time of sampling coincided with the discharge of fluid from the infected uterus, through the cervix, into the vagina large numbers of active organisms may be demonstrated. Except in open "pyometras," the discharges are usually intermittent so that the vaginal immunity rapidly overcomes the local reinfestation and no parasites can be demonstrated 24 hours later, an experience frequently encountered in the field. A low level of vaginal mucin antibody may not cause the death of the parasite, but does cause a marked reduction in motility, particularly after a short period at room temperature. This, no doubt, explains the teaching that discharges should be examined as soon as possible after collection. The "typical trichomonad discharge"—rather fluid and frequently containing streaks and flakes of pus—is also explained, as this has been found to originate in the uterus; the real locus of infection.

A consideration of these factors enables some selection of discharges to be made; those of uterine origin are worth examining microscopically for the motile trichomonad. On the other hand, mucin of vaginal origin, bluish-grey, opalescent, mucoid and homogeneous in character, although unlikely to contain active trichomonads, will be suitable for examination for antibodies by the mucin agglutination test. For this test at least 2 ml. are required; oestral mucin is unsatisfactory, and specimens must be examined from a number of the suspected animals and not merely from an individual case.

In making a diagnosis the two tests, microscopical examination and mucin agglutination, work well together; discharges unlikely to contain demonstrable trichomonads may contain well-developed antibodies and *vice versa*. The absence of infection as indicated by negative microscopical findings may also usefully be confirmed by negative mucin agglutination results.

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III. Infertility from the Point of View of an Officer in Charge of an Artificial Insemination Centre

BY

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A great deal has been written and a great deal more said on the subject of infertility and I know of no subject apart from politics or religion more likely to give rise to argument. I, therefore, wish to make it clear that any opinions expressed by me are my opinions. These opinions are based on seven years' experience in dealing with infertility, first, as a Sterility Officer, and, secondly, as a Veterinary Surgeon in charge of an Artificial Insemination Centre.

I found very early on that I had a choice of one or two lines of approach to the work and that unfortunately it was seldom possible to combine these. The first line of approach was that of getting the cow in calf, very often by purely empirical means. The second approach was that of finding out why the cow was not in calf. I must confess that I chose the first line, that of getting the cow in calf, partly because this was often the easier, but chiefly because I felt the practitioner had called me in and that he had originally been called in by the farmer to achieve this result. I never felt that this was satisfactory, but I am still of the opinion that the field officer is faced with this choice and cannot avoid it.

One might commence by asking, "What constitutes infertility?" This is a difficult question, but one which in practice I found answered for me. Owners of cows on the whole expect one calf from each cow every year, and if they do not get this they call it "infertility" and require the veterinary surgeon to deal with it.

I found the approach to the problem to be one first of assessment and then of elimination. I would like to emphasise the value of a personal assessment in all cases of infertility. This means an examination of all the animals and an assessment of the position of the herd following this. I discovered that it did not pay to accept the story of the owner. Often the owner is worried about one or two cows when, in fact, he is faced with a herd problem. In other cases the owner may have had cause to worry, but by the time the professional man is called in an assessment makes it obvious that the herd is returning or has returned to normal. Assuming that assessment showed that infertility did exist, I found the next step to be one of elimination. In cases of *herd* infertility one eliminated such causes as the *infertile bull*. Here history is of great help as the story of all being well up to a certain date and then everything going wrong points almost exclusively to this reason and an examination of the bull will verify this.

Other causes to be eliminated are *contagious abortion* and its aftermath, *trichomoniasis*, and possible cases of *vibrionic abortion*. In cases of *individual* infertility the causes to be eliminated are, of course, all those affecting the herd and also such causes as ovarian dysfunction, pyometra, endometritis, salpingitis, bursitis, occasional cases of pyogenic infection, and so on. Unfortunately, however, when all possible causes have been eliminated, one is often still left with a problem and it is this " problem " infertility which is engaging the energies of most of the workers in this field to-day.

I have always considered the conception rate obtained in a herd to be the reflection of a balance struck between the fertility of the cows on the one hand and the fertility of the bull on the other. It has been my experience that quite reasonable results are often obtained in a herd where the general fertility level of the females is rather low, provided the fertility of the bull is excellent. I believe that this is the explanation lying behind the practice adopted by many owners of changing the bull when results were not satisfactory. I would, therefore, advise anyone faced with a case of this " problem " infertility to make a thorough investigation of the fertility of the bull and if the investigation warrants it, to take all possible steps to raise it. It has been my experience when dealing with bulls on an artificial insemination centre that the optimum fertility can best be obtained from a bull by keeping him in the best physical condition possible. This can be achieved only by the consideration of the bull as an individual. One of the bulls at the Ruthin centre, for example, required 6 lb. concentrates per day to give and maintain his optimum output, whereas another, to do the same, required over 20 lb. concentrates per day. In the field I have repeatedly heard the term " working fit " applied to bulls considered to be in a satisfactory condition. This too often, in my opinion, means only that they are fit to work and no more.

During a period of three years at the Ruthin centre one of our objects has been to achieve a standard output (semen). The fact that month after month the conception rate for each bull on the centre remained somewhere between 60 to 65 per cent. does show, I think, that we have achieved this object. It was felt that since this problem infertility is almost insoluble because of the unknown number of factors bearing on fertility, the use of standardised semen would eliminate at least one factor in the herds with which we were dealing. As a result of this, one thing has become fairly clear, namely, that, whereas infertility arising from contagious abortion, trichomoniasis, etc., can affect any and every type of herd, this " problem " infertility—and, incidentally, anoestrus and ovarian dysfunction—are found almost solely in highly commercialised and scientifically managed herds.

With regard to treatment, from my own experience I believe that to date, at least, no line of treatment gives results better than or even comparable with iodine irrigation where this is indicated. During my seven years' experience I have irrigated a very large number of cows, but I have been able to follow up 673, of which 437 held either to their first or second service following irrigation. I, therefore, think iodine irrigation very well worth doing. I also think if it is worth doing at all it is worth doing well. In the vast majority of cases I do not regard one irrigation as of much value. I have made a practice of giving three irrigations at five-day intervals and allowing a lapse of about ten days after the final irrigation before attempting service. I also think the method of irrigation is important and I disagree strongly with pumping a measured amount of iodine solution into a cow or heifer with no clear idea as to whether the uterus is being burst, filled, or partly filled by the amount pumped in; in my view the uterus should be filled until it becomes slightly tense.

There is one final point to which I would like to refer and that is pregnancy diagnosis. Some recent correspondence in *The Veterinary Record* suggests that pregnancy can be diagnosed at anything from 25 to 30 days. The " return to service " figures for the Ruthin centre—which are based on some thousands—show that of every 100 cows not breaking at the first three weeks, 69 continue to hold; therefore, I suggest that anyone can assert that a cow is in calf which has gone three weeks and can make that assertion with an odds-on chance of being correct. To me, however, pregnancy diagnosis is a positive thing, and I would suggest that the practitioner will do his profession service if he pronounces a cow to be in calf only if and when he is positive she is in calf.

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IV. Non-specific Infertility

BY

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In giving a title of " Non-specific Infertility " to a paper it is not intended to give the impression that one is presenting a new disease affecting bovine reproduction, but rather that one is attempting to analyse some of those cases in which the diagnosis of the cause is, or should be, " I don't know." Neither is it the intention to add to the stock of cures for infertility, but it is hoped that, if the analysis be correctly founded, it may open up an avenue of treatment which eventually will reduce the numbers of cows which fail to reproduce according to plan.

Infertility in the bovine rocketed into prominence in practice about ten years ago and undoubtedly a considerable amount of it was due to causes which are now well known. Treatments for these more definite diseases of the reproductive system have been numerous and have met with varying degrees of success. It is with the residue that it is now proposed to deal.

One has been familiar, for a long time, with the odd cows—usually the best ones—in the herd which will not breed and it has generally been the practice to ascribe a cause to this or that—maybe an ovarian dysfunction, maybe a uterine abnormality—and to deal with it accordingly and more or less empirically, but without seeking the true cause of the breakdown in the patient's reproductive cycle. But unfortunately the matter does not end there. In another season it may be two cows which may require treatment empirically, or a bunch of heifers may not come into oestrus as required, and so the picture may be built up until one finds a herd as a whole in trouble. If one has eliminated, as a cause, *Br. abortus*, and, in spite of grave suspicion, *T. foetus* is also exonerated, then it would appear that instead of a herd infertility one has a herd full of individual cases of infertility. Such infertility may come within the somewhat narrow bounds of functional infertility or it may in a measure appear that it fulfils the theories of Albrechtsen and Neilsen, who laid the blame primarily on the uterus and accessory genitalia. Generally this has received the title of non-specific infertility. A considerable proportion of these cases are of a temporary

nature and, if uncomplicated by drastic empirical treatment, will resolve spontaneously, usually at the latest with the first of the spring grazing. Whether the individuals be taken singly or as a herd, or simply as a group of awkward cases, it seems possible to allocate each to a category which might be called a deviation from normal physiology. In order to reduce as far as possible the number of categories, it will be seen that the sub-headings cover a fairly wide range.

Anoestrus in heifers.—The first sub-heading perhaps requires the least explanation, as it covers an all-too-familiar type of case—viz., anoestrus in heifers. In this category one has, as a rule, autumn or winter born calves which in the course of nature have commenced their oestral cycles during the summer and have not been mated because of a desire that they themselves should produce their first born in autumn or winter. But with the onset of winter, signs of oestrus cease, and it is seldom that any treatment is really effective. More often than not, examination reveals that the ovaries and uterus give every sign of hibernating.

Involution of the non-gravid uterus.—The optimum time taken for *post-partum* involution has been the subject of recent work and it is suggested that where this deviates from the normal time, the sequelae may give rise to infertility. It has been found that when involution is too rapid there is an incomplete evacuation of uterine debris, while a prolonged period of involution may be a predisposing cause of secondary infection becoming established in the uterus. It is felt, too, that retention of placentae may be associated with this, whether by trapping of the bulk where involution is rapid or because shedding does not take place normally during slow involution.

Prevailing tone in post-involution period.—It is noted that the tone of the uterus varies throughout the different phases of the oestral cycle in the normal cow, and it is only when the tone of the organ is outside normal physiological range that it is deserving of attention. During oestrus the tone of the normal uterus is increased, whilst it is poorest about the middle of the cycle.

While it cannot be said that normally the range of tone is great, it is marked and it would appear that high tone at oestrus facilitates the passage of spermatozoa and the lower tone assists the implantation of the fertilised ovum some days later. It has been found, however, that when a study of non-specific infertility is made, frequently throughout the oestral cycle uterine tone may vary from a hypertonic to a hypotonic state, so that, in the former case the fertilised ovum would be expected to become fixed in a uterus of greater tone than is normally found during oestrus or that the spermatozoa may be expected to cross the uterus when it is even more flaccid than when the egg is normally received. (In this connection it was observed while practising A.I. that whereas a hypertonic uterus was not considered a likely subject to " hold," the atonic type was a better bet because the difficulty besetting the sperm was partly overcome by the use of the pipette!)

Ovulatory function

(*a*) *Duration of oestral period.*—It is well known among veterinarians and stock keepers alike that the duration of oestrus varies individually and seasonally, being most commonly shorter as winter goes on, but averaging about 22 hours in summer. Not infrequently in a herd where infertility has become a problem the owner has observed (and perhaps has attached little importance to it) that the duration of oestrus has varied among some or all of his stock. It may be that in winter it has become abnormally short and, perhaps, of diminished intensity, so that cows in oestrus are difficult to spot; or that in summer the owner is surprised to find a cow " still bulling next day!" Or it may be that one or more of his cows are " a nuisance " because of their wild behaviour during oestrus. While these cows may procreate normally it is a physiological deviation to be noted.

(*b*) *Interval between oestral periods.*—Here, again, a certain amount of latitude is granted to individuals, and because of this one tends to ignore the fact that perhaps several cows—otherwise apparently normal—have too short a cycle. It is only when one finds that a cow returns in oestrus at what should be mid-cycle that the matter is noted. Similarly, when the oestral cycle is prolonged, little comment is aroused, and it is surprising how often a cycle may be prolonged to six weeks and the cow be excused because the owner did not notice. Such a prolongation may cover conception, foetal death, and reabsorption.

It has been observed that some cases of deviation may be indicated by a kind of " ghost heat "—where an owner may be suspicious of a re-occurrence of oestrum perhaps in ten days or perhaps at three weeks after mating. In this form the symptoms occasion little comment, but in the extreme form of " bulling throughout pregnancy," as it is less common it is more frequently remarked upon.

It is suggested that any case of non-specific infertility will fit into one or other of these classes of deviation from the physiological normal. Treatment in the past has, it is felt, been haphazard. The use of hormone therapy has been successful only in a percentage of cases, while in others the results have been almost disastrous. Similarly the use of Lugol's iodine, while probably more successful, seems to owe most of its success to the general stimulation of its counter-irritant action and appears to be in the same class as cantharides used as an aphrodisiac. In many cases Lugol's iodine has caused much damage to the tract, inducing sloughing of the vaginal mucosa and prolongation (if not causation) of a first or second degree metritis. Such lines of treatment appear to be only expedients, and since it has been suggested that the conditions are physiological deviations, an endeavour has been made to find a cause by ascertaining wherein lay other basic deviations from the normal.

It must be admitted that many of the unnatural conditions of domestication are in fact malfunctions which have genetically obtained a degree of acceptance by the animal, and when other physiological conditions are upset these functions or malfunctions are among the first to be affected. The mutation from a limited breeding season to a state of polyoestrum desired by the modern owner appears to be finely balanced and a return to monoestrum by the heifer in winter anoestrus seems to indicate a physiological disturbance of the balance maintained in the modern cow. The linkage between uterus and udder is too elementary to require any comment, but the fact that increased milk production may result in decreased uterine function seems to indicate a physiological unbalance.

If the cow is so genetically constituted as to produce a given quantity of milk—however great—and a calf, the physiological unbalance must apparently be shown in the blood, the udder or by a badly balanced food. It was found, working on this theory in 1945, that little could be obtained from a blood examination, apparently because the blood stream could call on bodily reserves and that those reserves may have been in exactly those organs which maintained the balance. While this principle has not been

pursued, it is felt that with more study blood examination may be revealing; but it will only do so indirectly—say, by revealing liver dysfunction, especially as it is known that the liver plays a part in the metabolism of oestrogens.

It is felt that no basic cause can be shown in the udder or milk, except that some sort of drying off apparently helps to point to an unbalanced intake of food.

Food.—Because the modern stockkeeper has a certain appreciation of dietary requirements of the dairy cow, it seemed that closer attention should be paid to the quality of the constituent parts of the diet.

It seemed necessary, therefore, to pay some attention to the animal's nutritional environment. It could be shown that an upset in the balance of the major elements could be reflected in the physiological unbalance in the animal and, further, that the major and minor factors were interrelated to maintain a normal function.

It has been found that where disturbance of the major and minor factors in the nutritional environment was corrected the deviation in the reproductive physiology resolved itself. Certain cases of metritis which apparently had developed following incomplete involution resolved on the completion of involution. In some cases oestral cycles which had been irregular as regards periodicity and intensity reverted to normal, and when uterine tone was brought within a normal physiological range by adjustment of nutritional factors conception occurred.

It was found, also, that in typical clinical cases of metabolic disturbance the state of the genitalia deviated from normal and that on resolution of the major disturbance the normal condition of the genitalia was restored.

These observations have been made with reference chiefly to the female bovine, but there have been instances where it has been shown that lapses from fertility in the bull may be caused by similar nutritional factors and it is even tentatively suggested that where such a cause is severe or prolonged, permanent infertility may result.

It is too early, as yet, to be categorical about how these adjustments may be achieved. Many more observations require to be made to confirm the various steps being taken, because it seems to be easier to categorise physiological deviations in the animal than it is in the environment, where apparent correction of one factor may be cancelled out by another occurring either seasonally in nature or cyclically in general agriculture.

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Summing-up of Discussion

Professor T. Dalling, in summing up the discussion, referred to the excellent standard of the papers presented and the interest attaching to the remarks of the different speakers. He was gratified by those contributions, because they showed how much interest was now being taken in the subject of infertility in cattle and how expert study was being made and was progressing. He recalled the time when very little of a definite nature was known on the causes of infertility and how attention had been given mostly to conditions of the genital tract associated with infections. It was evident from what had been said that our knowledge of the control of such infections, *e.g.*, trichomoniasis, was now quite far advanced. Much thought and hard work had gone into that subject and new techniques had been devised for the diagnosis of the infection.

There remained, however, a considerable lack of information on the more obscure causes of infertility. He referred to the complicated endocrine mechanism and expressed the opinion that, although observers would probably point to certain abnormalities which when corrected would enable some animals to regain a state of fertility, it was essential that a prolonged and detailed study be made of the physiology and biochemistry of the reproductive system of the normal animal. He had been pressing this point for a long time now and, although he realised the many difficulties associated with such a study, he was quite convinced that we would not progress far without it.

He also drew attention to the lack of accurate knowledge on the relationship between nutrition and fertility. He felt that the evidence now available was in the nature of a pointer and that the subject should be actively pursued.

With reference to fertility in bulls, here again further study was necessary, especially in view of the large numbers of cows and heifers which often were being artificially inseminated with the semen from an individual bull.

The paper and the discussion indicated clearly that veterinary surgeons had all these problems in mind and he expressed the hope that opportunities to continue this excellent work and to initiate new studies would be made available by those who were in a position to do so.

CLINICAL COMMUNICATIONS

THE TREATMENT OF BOWEL OEDEMA IN PIGS

W. A. NOBLE and JAMES FRAME, ms.r.c.v.s.,
March, Cambridgeshire

Oedema of the bowel has proved a troublesome disease in this part of the country during the last 12 months and in our opinion the disease is definitely on the increase.

Subjects.—A litter of ten pigs, large white × large black, three months old.

History.—A new sack of meal had been purchased some ten days previously and the animals had been eating well, but the best pig in the litter had been found dead in the morning and one appeared slightly drunk and inclined to lie under the straw.

Symptoms.—The affected pigs were in good bodily condition; they showed inco-ordinate locomotion; upper eyelids slightly oedematous. Temperature 101° F.—slightly subnormal. Two others were off food.

Diagnosis.—Oedema of the bowel.

Post-mortem *Examination.*—Examination of a dead pig revealed the following. There was a considerable amount of fluid in the abdominal cavity and pericardial sac. Congestion of coronary vessels. Stomach walls thickened and slightly oedematous. Stomach full of food. Lymphadenitis of mesenteric lymph glands. Signs of oedema in mesentery joining spiral colon. Capsule of kidney stripped easily and there was congestion of the medulla.

Treatment.—2·5 c.c. phenergen intramuscularly; 100,000 units penicillin sodium salt subcutaneously; repeated daily for three days.

Prognosis.—In the outbreak reported, three animals were treated; two of them had merely gone off their food and showed oedema of the eyelids, but at the time we were called in they were not showing any inordination of movement—in fact it was not until we pointed these two pigs out to the owner that he admitted that two other pigs as well as the one which was staggering had not come up for their breakfast.

The pig which was staggering received three injections each of penicillin and phenergen on consecutive days. On the fourth day it was normal, the other two animals only required two injections of phenergen and penicillin and were better in two days.

In all, 80 pigs which have been diagnosed as suffering from oedema of the bowel have been treated by the above method. Twenty out of this number died, but at least five of these animals were too far gone really to merit treatment. Only twice have we been able to use untreated controls in a litter as a check to our form of treatment and they died within the 24 hours.

(*Continued on col.* 1, *page* 545).

Remarks.—Phenergen has been used alone in this treatment but proved ineffective—as did penicillin when used alone; yet combined as described above we were getting at least 60 per cent. cures. The rate of recovery varied greatly. Some pigs even after three injections became completely paralysed in the legs and were unable to open their mouths and feed in the normal manner. When a trough of thin food was placed against the head they were able to suck the thin fluid through their teeth. We have known pigs to be down for a week and three weeks have elapsed before the pig which appeared normal in every way could gulp its food down normally.

There is a constant history of a change of food and we feel that some factor is created which causes an anaphylaxis and allows the normal bacteria in the bowel to become pathogenic. This might account for the difficulty in transmitting the disease experimentally.

Acknowledgments.—We are indebted to Messrs. May & Baker for the supply of phenergen.

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THIOURACIL IN THE TREATMENT OF HYPER-THYROIDISM IN A DACHSHUND BITCH

PAUL CROSFIELD, M.A., M.R.C.V.S.,

Chipping Norton

Subject.—Dachshund bitch, two years old.

History.—Progressive emaciation, in spite of an enormous appetite; restless, hypersensitive, and full of nervous energy. Weight 7½ lb.

The owner had tried such treatment as worming, fattening foods and cod-liver oil before seeking advice. As hypothyroidism is fairly common in dachshunds, it seemed reasonable to suppose that the imbalance might on occasion be in the direction of hyper-thyroidism. It was therefore decided to try the effect of thiouracil—an antithyroid agent whose pharmacology is not yet understood—and methyl-thiouracil, gr. ½, was administered every other day for eight days. A week later, the weight had increased to 10 lb., and the bitch was much quieter and less restless. Regular weighing showed a slight loss of weight after a month, so a second similar course was given; the weight is now 12 lb., and it is hoped to increase this to 14 lb., the scales being used regularly and short courses of methyl-thiouracil being given as required.

The change of temperament was as remarkable as the increase of weight, the bitch being now a restful companion, without having lost her keenness and intelligence.

R.S.I. Sessional Meeting at Burnley.—Included in the proceedings, commencing at 10.15, on Friday, October 6th, at the Central Library, Grimshaw Street, Burnley, is a paper on "Some Aspects of the Supervision of Food supplies," by Mr. J. King Shaw, M.R.C.V.S., Veterinary Officer, Burnley. The Mayor will welcome and entertain to luncheon, and Members, etc., R.S.I., who may introduce one visitor, are asked to inform the Hon. Local Secretary, Dr. D. C. Lamont, M.O.H., Public Health Department, St. James' Street, Burnley, of their intention to be present.

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Weekly Wisdom

In the schools and in the Courts Smuts sat at the feet of many Gamaliels, but he learnt more from a man who never went to school —General Botha—than from them a'l.—The Times Special Memoir.

ABSTRACTS

[The Effect of Temperature, Humidity, Air Movement and Solar Radiation on the Behaviour of Cattle and Other Farm Animals. Findlay, J. D. (1950.) *Bulletin No. 9 of the Hannah Dairy Research Institute.* Pp. 178.]

It is not practicable in a brief abstract to do more than give the outlines of this extensive (but not exhaustive) review of existing knowledge. The importance of climatology in relation to animal health and production has become much more widely appreciated during recent years, and while much of this bulletin has reference to the adaptability or otherwise of cattle to tropical environments the subject is of fundamental interest in Great Britain also, as the studies of Richard Phillips and others have indicated.

After an introductory chapter in which the relationships between food intake, heat production, heat absorption and heat emission are discussed briefly, separate chapters are devoted to the effects of climatic environment upon grazing habits of cattle, and to the effects of tropical environments on body temperature, respiration, heart rate, blood composition and milk of the same species, while a separate chapter deals generally with the effects of tropical environments on the physiology and behaviour of sheep, pigs and domestic fowls. Five further chapters deal with the measurement of the physiological reactions of farm animals to their environment, and a description is given of the psychrometric room at the Hannah Institute. Veterinary clinicians will be interested in the methods described for the recording of temperature, respiration, heart rate and blood pressure.

The mean respiration rate for cattle in the range 50° to 60° F. has been found to be 22 ± 6 per minute, but great variations occur. The rate rises with environmental temperature, especially above 80° to 85° F. As in the case of body temperature, there appears to be a critical hyperpyrexial air temperature about 85° F., and above this a sharp increase in respiration rate occurs. The normal pulse rate of adult cattle is now believed to be 60 to 70 beats per minute, and that of younger cattle probably up to 90 per minute. Tropical breeds of cattle appear to have more erythrocytes per cu. mm. than temperate breeds, and a higher white cell count. From the little published evidence available, it is suggested that the composition of the milk of tropical cattle does not differ much from that of temperate cattle when both are in their own environments. Increases in the environmental temperature up to about 80° F. cause a fall in the percentage of fat. Some workers have found that above 85° F., however, the milk yield declines and the fat percentage tends to increase, these changes being accompanied by an increase in the degree of unsaturation of the butter fat and a decrease in its content of volatile lower fatty acids.

The sheep appears to be fairly tolerant of high environmental temperatures and the pig to be much more susceptible, the fowl occupying an intermediate position. Above 80° to 85° F. increases in rectal temperature occur with increase of air temperature in all three species, and precede increases in respiratory rate. In sheep and pigs the heart rate is also increased in similar circumstances.

Veterinarians in the Colonial Service will find this bulletin to be of considerable interest and importance, while it will be welcomed by all who are engaged in studies relating to the physiology, nutrition and behaviour of domestic animals.

A. N. W.

[The Rectal Temperature in Normal and Infected Pigs. Pullar, E. M. (1949.) *Brit. vet. J.* **105.** (12.) 437–452.]

These observations were carried out with the aid of standard clinical " half-minute " thermometers, approximately 10 cm. in length. The thermometer was lubricated in water, inserted for some two-thirds of its length into the rectum and kept in position for approximately one minute.

From a study of temperature charts so obtained from 88 pigs, ranging in age from one to eight months, it was concluded that the mean rectal temperature was 102·13° ± 0·413° F. (38·97° ± 0·229° C.), the range being 97·2° F. (36·2° C.) to 106·6° F. (41·4° C.). With individual animals, the lower the mean temperature, the greater was the variation about that mean.

In a study of three pigs it was shown that a marked temperature gradient existed in the rectum, the maximum temperature zone being apparently more than 6 inches from the sphincter ani and beyond the reach of a standard clinical thermometer. [The existence of such a gradient in cattle was shown in 1921 by Max Kriss (*J. agric. Res.* **21.** 1.) and has since been confirmed in that species and also in some laboratory animals.]

In some 18 per cent. of pigs tested a definite excitement pyrexia appeared to be present until they became used to handling. It is suggested that for this reason reliance should not be placed upon a single observation in an individual pig.

A study was made also of the temperature records of pigs with infection, and an attempt to establish the significance of apparent pyrexia in experimental pigs is provided in the form of rules. In normal pigs it was found that in only a very small percentage (0·15) of cases did the recorded temperature lie above the level of the mean for that individual plus 1·8° F. (1·0° C.), *i.e.*, approximately 4·5 times the standard error for all observations. In essence, the rules relate to the significance of temperatures that lie more than 1·8° F. (1·0° C.) above the previously recorded mean, which should be calculated on not fewer than seven pre-exposure recordings.

In infected pigs the deviation from the mean was usually greater than in normal pigs. Sub-normal temperatures were recorded more frequently in some individuals than in others; they were noted frequently in pigs with infectious pneumonia, but rarely in those with enteric infections.

A. N. W.

"EVANS" FINAL YEAR STUDENTSHIPS, 1950-51

The Animal Health Trust announces that the "Evans" Final Year Studentships for 1950-51 are awarded to the best student of the fourth Year in each college, taking into account the results of his work during the previous years. The awards are made on the recommendations of the colleges. Those recommended for the awards to be made in the coming year are:—

Royal Veterinary College, London—Mr. D. G. Howell, Palgrave, Diss, Norfolk.

Royal (Dick) Veterinary College—Mr. Robert Burrows, 33, Hamilton Road, Derby.

The Veterinary School, University of Liverpool—Mr. A. N. Evans, Lower Keel, Berriew, Montgomery, Mid-Wales.

Glasgow Veterinary College, Glasgow—Mr. D. E. Watkinson, 25, Napier Road, Leytonstone, London, E.11.

Veterinary College of Ireland, Dublin—1, Mr. S. F. M. Davies, Shrewsbury House, Old Connaught, Bray, Co. Wicklow; 2, Mr. J. P. Keating, Ait an Chuain, Rathfarnham, Co. Dublin.

These awards are made possible through the generosity of Evans Medical Supplies, Ltd., of Liverpool.

REVIEW

[Grass. The Year Book of Agriculture, 1948. Published by the United States Department of Agriculture, U.S. Government Printing Office, Washington. Procurable through H. K. Lewis & Co., Ltd., 136, Gower Street, London, W.C.1. 18s.]

Those who are already familiar with this series of publications will not need the merits of this particular issue laying before them. Their reputation as valuable and easily readable, up-to-date compendiums, is already established and the latest addition to the series is no exception.

Whilst to some grass may be little more than the green stuff that grows in the hedgerows, or you walk on when crossing the lawn, its meaning to the agriculturist has, over the last decade, expanded into something of extreme importance. That this publication runs to 900 pages and deals with the subject under a score of different headings, is ample evidence of this.

The style is popular but concise and the information, lavishly illustrated, is presented in a readable and attractive manner. Grass certainly holds a place as a primary crop in agriculture and much information is now available regarding its cultivation, place in rotations, variations on different soil types, value as a feeding stuff—standing or preserved—its importance in the control of erosion, etc.

Whilst the farmer, the horticulturist and the layer of airstrips have all been catered for, there is much that will be of help and interest to veterinarians.

NOTES AND NEWS

Diary of Events

Sept. 22nd.—Meeting of the Biochemical Society in the University of Liverpool (Derby Hall, N. Mossley Road), 11 a.m. The meeting will take the form of a symposium on "The Biochemistry of Fish."

Sept. 22nd.—Meeting of the North Wales Division, N.V.M.A., at Bettws-y-Coed (Bryn Mawr Chapel School Room), 2 p.m.

Sept. 27th.—Meeting of the Editorial Committee, N.V.M.A., 1.30 p.m., to be followed by Meeting of the Executive.

Sept. 28th.—Summer Meeting of the East Midlands Division, N.V.M.A., at Thurgarton, Notts. (See Notice.)

Sept. 29th.—Meeting of the Midland Counties Division, N.V.M.A., at Cheltenham (Fleece Hotel), 2.30 p.m.

Oct. 5th.—Meeting of the Western Counties Division, N.V.M.A., at Exeter (Rougemont Hotel), 2 p.m.

Oct. 13th.—General Meeting of the South Wales Division, N.V.M.A., at Carmarthen. (See Notice.)

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THE N.V.M.A. AT CARDIFF

(Continued from page 536)

Last week we left the members in enjoyment of the Civic Reception at the City Hall on the evening of Monday, September 4th. It will probably be in " right ordering," however, if we proceed immediately to record in summary the proceedings of the main event of the Association's year, the Annual General Meeting, which was held in the Technical College, Cardiff, on the afternoon of Wednesday, September 6th.

To pass at once to the opening item, the President, Mr. J. W. Bruford, devoted the earlier part of his stimulating address to an exposition of what was, in

fact, the main theme of the Congress—the value of the veterinary profession to the agricultural economy of the country. The present wide acceptance of this rôle, which could not have been foreseen by the veterinarian of an earlier day, yet required much fuller recognition by authority if the profession was to play its rightful part in ensuring that human food of animal origin is safe and of high quality. That public opinion as a whole, however, and the Governments which reflect it, have not been and are not now alive to the importance of veterinary science to the nation and the Commonwealth, was clearly indicated in the list of salary ranges paid to professional civil servants —this list shows the category in which veterinarians are placed at the lowest but one. The responsibilities of the profession should not stop at the farm gate, but should be extended right up to the time food is purchased by the housewife, and to this end the Chief Veterinary Officer should be made directly responsible to the Minister or Ministers concerned, and given full responsibility to correlate the work.

Passing to the new attack on bovine tuberculosis to be launched on October 1st, the President asserted that it was clearly the wish of the country, in the interests of agriculture and of human health, that this scourge should be eradicated from our herds. A serious threat to the success of the scheme, however, lay in the meagre recruitment, for which inadequate remuneration and limited opportunities of promotion were responsible, to the State Veterinary Service in whose hands largely would be the fulfilment of this great task. The cost to the nation of the eradication of tuberculosis through premiums on milk and beef cattle would amount to millions. "It seems a pity, therefore, to quibble about the salaries of the few hundred men who do the work." The profession welcomed the task of establishing a national herd free from the disease; as to the suggestion that lay testers be employed, there was no greater opportunity for the better appreciation of the standard of husbandry in a herd than was provided during a tuberculin test, and more sound advice had been given by the veterinary surgeon to livestock owners in the course of or following such a test than at any other time or by any other body of men.

The rapidly expanding Artificial Insemination Service was another field in which the veterinarian had a large part to play, for he was responsible for its technical efficiency. Only the practising veterinary surgeon could appreciate to the full the problems which made up the daily work of the Centre Manager, and there must be the closest co-operation between them.

Turning to research, the President pointed out that most veterinary research institutes, since they are supported by public funds earmarked for agricultural improvement, have devoted their attention almost entirely to the health of farm livestock, but all would agree that there was a need for more research into the diseases associated with both the horse and small animals. The work in that direction being carried out by the Animal Health Trust—an independent body—therefore, was worthy of the fullest support not of the profession only, but of the animal-loving public. To the latter the President offered the opinion that money given in support of the Trust for the furtherance of veterinary education and research would be ultimately of more value than that spent in opening more clinics, especially in areas which are well provided for by established veterinary surgeons. He firmly believed that, through what had become known as the R.S.P.C.A. "decentralised scheme," the profession was better able than were many "free" clinics to give an adequate service to animals, particularly those requiring expensive or protracted treatment beyond the financial means of their owners.

The President brought his survey to a close with a few words on the supply of biologicals, with special reference to those which, in the opinion of the Association, in the interests of disease control should be made available to the farmer only through the veterinary surgeon. It was the duty of the profession to see that no ground was given for any apprehension that restriction of use might arise through an increase in cost, but that practitioners would, in fact, see to it that these products were used more widely and more effectively than ever before.

"I hope I have been able to convey to you," said the President in conclusion, "what I believe to be the policy of the N.V.M.A. on matters which affect our immediate future, in order that each and every one of us may strive with a fuller understanding, not only to bring effect to this policy, but above all to justify it."

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Next year's Congress will be held at Eastbourne and that for 1952 at Harrogate—decisions, the first of which was purely confirmatory, taken in both instances following the most careful consideration of an impressive number of invitations. The election of Mr. S. F. J. Hodgman, Director of the Animal Health Trust's Canine Research Station at Newmarket, as President of the Association for the ensuing year was enthusiastically carried out, Mr. Bruford commending him to the assembly with the assurance that in Mr. Hodgman they would enjoy the services as President of a man of sterling character, wide experience and great charm. All regretted the inability of Sir Weldon Dalrymple-Champneys to present in person to Mr. E. Brayley Reynolds the cup and medal of which he, as an outstanding surgeon who has done much to promote the prestige of veterinary racing practice and the advancement of sound bloodstock breeding, is so worthy a recipient. Mr. Reynolds, in his acknowledgment, urged upon the practitioner the importance of keeping clinical records; in their absence much material of great potential value was lost. His greatest satisfaction in the award was that he would appear in his professional life to have gained the esteem of his fellow men. This section of the meeting was brought to a close on an item which gave great satisfaction to everyone present: an eloquent, deeply sincere tribute by the President to Mr. Frederick Knight for his able and devoted service to the Association over a period of 25 years as Secretary, Mr. Brown associating the staff at Headquarters most warmly with this tribute and expression of regard. Mr. Bruford, on behalf of the Association, then presented the General Secretary with gifts comprising a television set, a canteen of cutlery and a gold watch. Mr. Knight voiced his appreciation in terms moving in the sincerity of their references to the happiness he had found in the fulfilment of his duties and his relations alike with the successive officers of the Association, members of Council, the general body of members and his staff colleagues.

The informative record of the work of the Association made in the annual report, together with the healthy-looking balance sheet, having been accepted by the meeting, now restricted to members only, the recommendations made by Council concerning the remaining officers of the N.V.M.A. were approved with enthusiasm. Mr. Bruford, of course, becomes Senior Vice-President and, as has already been anticipated in these columns, enthusiastic acceptance was given to the name of Mr. A. J. Wright, of Macclesfield, as Junior Vice-President and President-Elect. Much applause, also, greeted the election of another practitioner in Mr.

H. F. Hebeler, of Langport, Somerset, to the Hon. Secretaryship in the place vacated (by rule after three years' tenure) by Mr. Geo. N. Gould, of Southampton, whose sterling services were accorded demonstrative as well as formal thanks. The Hon. Treasurer, Mr. H. E. Bywater, happily has consented to remain for another year in charge of the finances of the Association, and enthusiastic if automatic re-election was made of Mr. F. Knight as General Secretary.

A resolution was passed authorising amendment of the Articles of Association to render persons whose names are entered on the Supplementary Veterinary Register kept in accordance with Section 6 of the Veterinary Surgeons Act, eligible for membership of the Association. A further authorised amendment provides for the election as a life member of the Association, on the recommendation of the Council, of a member who, in the opinion of that body, has given long and valuable support to the Association. The well-merited honour of initiating the list of such life members was accorded, by unanimous election, to Mr. Richard Hughes, F.R.C.V.S., of Oswestry.

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To continue our note on the scientific proceedings, these created a degree of interest which, in the event, found an implacable enemy in the limitation of discussion imposed by time. Following discussion of Tuesday's first paper, "Clinical Diagnosis of Diseases of the Abdomen of the Dog and Cat," by Mr. J. S. J. Lauder, of Altrincham, which was opened by Miss O. D. James, of Cardiff, and Mr. J. W. Heney, of Dublin, discussion of that on "Some Pig Diseases," by Dr. H. G. Lamont, Mr. D. Luke and Mr. W. A. M. Gordon, of Belfast, was entered upon. The opening items took the form, firstly, of an illustrated contribution by Mr. P. L. Shanks, of Leeds, and, secondly, what proved to be a masterly, full-length paper by Mr. T. F. Timoney, of Dublin. Unfortunately, there was no possibility of further general discussion of this most interesting subject. All were glad that a full morning (that of Wednesday) had been accorded the discussion of the paper on "Deficiency Diseases, particularly Acetonaemia in Cattle," by the Association's contribution-guest of honour, Professor Birger Carlström, of Stockholm. With a little aid from the platform, the Professor made a courageous and effective reply in English to a good discussion, opened by Mr. R. H. Smythe, of Nottingham, and Dr. J. R. Holmes of Liverpool. Any doubts that the Provisional Committee may have entertained as to the degree of interest likely to be evoked by the Symposium on Sheep Diseases presented on Thursday morning, were completely resolved in the event. This series, contributed by Dr. S. Jamieson (Aberdeen), Mr. L. E. Hughes (Aberystwyth), Mr. W. T. Rowlands (Bangor) and Mr. J. T. Stamp (Edinburgh), was subjected to a high-pressure discussion, despite the full morning at disposal, the openers being Mr. D. E. Davies (Llanybyther) and Mr. D. R. Allen (Cardiff). The last day's discussions revealed no diminution in intensity, when there were considered the paper by Mr. H. Begg (Strathaven) on "Diseases of the Stomach of the Adult Ruminant," with Mr. A. T. Morgan (Carmarthen) and Mr. D. G. E. Davies (Llandyssul) as openers, and that by Mr. J. R. Lawson, of Weybridge, on "Strain 19 and the Control of Brucellosis," to the discussion of which (again seriously curtailed) the opening contributions were made by Mr. A. J. Wright, of Macclesfield, and Mr. L. Guy Anderson, of Aylesbury, whose observations were summarised in his absence, pending their publication in complete form in *The Veterinary Record*. At this session it was a great pleasure to hear the helpful and informative contribution made by Dr. A. B. Crawford, representative of the American Veterinary Medical Association.

The resumed demonstrations on Tuesday afternoon again attracted an excellent attendance. For the second time, anaesthesia provided the main theme, in the capable hands of Professor C. Formston, of the Royal Veterinary College, while Mr. W. T. Harrow (Wilmslow) kindly resumed his activities in the unavoidable absence of Mr. E. O. Longley. In addition, an able demonstration of teat surgery was given by Mr. J. W. Burgess, of Edinburgh.

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Each evening was agreeably occupied by one or other of the remaining time-honoured events which now are established features of the social programme. If the Civic Reception was characterised by an atmosphere of dignity and spaciousness, that given by the President and Mrs. Bruford at the Park Hotel was at least equally enjoyable by reason of the spirit of friendly intimacy which prevailed amongst a company united in its attachment to their hosts. At the Annual Banquet, on the following evening, speakers subsequent to Dr. Montgomerie, Senior Vice-President of the Association, who submitted "The City of Cardiff" at the outset, were set a standard perhaps best illustrated by the comment—probably unique as coming from the Chief Citizen of a Capital in compliment to one of our officers—"I have never heard a better speech on the subject," which now adorns a signed menu card. The Lord Mayor, Alderman George Williams, himself achieved a high level of eloquence in response. The verbal "meat" of the occasion may be said to have been provided by Mr. R. Bolton, Chairman of the Farmers' Club, who proposed the toast of the Association and, in a very thorough exposition, emphasised the importance of a veterinary approach to the vital problem of increasing the country's food supplies from home sources. The President, who was accorded an affectionate ovation, emphasised this theme in his reply, with special reference to the value in this connection of the ever-developing degree of mutual co-operation between the members of the veterinary profession and those of the agricultural community.

The incoming President, Mr. S. F. J. Hodgman, gave great pleasure with the sincerity of his submission of the toast of "The Guests," while the thoroughly enjoyable function ended on the high note of hilarity inspired by the yarns (to be anticipated from an old sea captain) of Alderman James Griffiths, Chairman of the Health Committee of the Cardiff City Council, who voiced in breezy fashion the gratitude of the guests for a convivial evening, their enjoyment of which clearly was shared in equal degree by the remainder of the company.

The absence of any "set" Congress Excursion was compensated for most agreeably by the visit paid, at the instance of Mr. R. W. Hall, to Barry Island—a neighbouring pleasure resort on the Bristol Channel and a place well endowed by Nature, with the artificial aids common to such centres, to refresh any who, by the Thursday, might have been feeling the effects of a succession of long sessions and late nights. The Association were the guests of Mr. Hall, and at the termination of the bowls competition, which formed part of the afternoon's programme, the party relished a substantial tea. Informal though this occasion was, all were delighted that the President, in warmly thanking Mr. and Mrs. Hall for their kindness, took the occasion to express the gratitude of the "National" for the splendid part played by the South Wales Division (of which Mr. Hall is President) in ensuring the success of the Congress. Mr. Hall included in his acknowledgment the very charming reference to the welcome presence at Barry of so many

youngsters amongst the party, that might have been expected of him. The Ladies' Guild Dance in the evening, in aid of the resources of the Victoria Veterinary Benevolent Fund, was again an unqualified success.

Leaving until this late stage any mention of the weather—because the less said about it the better—its only redeeming features were a fortunate remission of downpour or drizzle on such important occasions as the above, the "demonstration" afternoons, and the trip to the lovely Wye Valley and Tintern, which gave the ladies unalloyed enjoyment on the Tuesday. On the previous day they had visited, but scarcely seen, Porthcawl.

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At its closing meeting (the adjourned Annual General Meeting) the proceedings were largely a happy expression of the gratitude felt by the President, Council and members of the Association to the large number of bodies and individuals whose efforts had been responsible for the unquestioned success of the sixty-eighth Congress of the N.V.M.A. In this connection special tribute was paid by the President to the Hon. Local Secretary, Mr. John H. M. Hughes, "for the very efficient and kind way in which he has run the Congress." The latter, in his acknowledgment, spoke in tribute to the co-operative work of Mr. R. W. Hall, of Barry, and that of Mr. D. K. Bryson, the Hon. Secretary of the South Wales Division. The delivery of spoken and written messages from the delegates of overseas countries, one of whom made a loudly applauded reference to the gracious participation of Mrs. Bruford, was an outstandingly pleasant succeeding feature. Finally, came the induction of Mr. S. F. J. Hodgman, of Newmarket, as President of the Association for the year 1950-1951, by the outgoing President, Mr. Bruford, whose dignified efficiency throughout his year of office was exemplified by his conduct of the proceedings of the conference.

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N.V.M.A. Conference on Artificial Insemination

It is intended to hold a whole-day conference on artificial insemination, open to members of the veterinary profession interested in this subject. The conference will be held in the auditorium of the Wellcome Research Institute, 183, Euston Road, London, N.W.1, on Thursday, November 2nd, 1950, at 11 a.m. Members will remember that this was the venue of the very successful Grassland Conference in October, 1948.

The main topic of the conference will be consideration of the ways and means of effecting and maintaining an increase in the conception rate in herds receiving the artificial insemination service. Veterinary surgeons employed at A.I. centres and N.V.M.A. representatives on advisory committees will be invited. It is hoped that all other veterinary surgeons interested in artificial insemination will make it convenient to attend.

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PERSONAL

Births.—Brown.—On September 9th, 1950, at Somerleigh Court, Dorchester, to May, wife of A. C. L. Brown, M.R.C.V.S., a son.

Bryson.—On September 3rd at St. Christophers Nursing Home, Chatham, to Honor, wife of Robert W. Bryson, Southern Rhodesia, a son (Nigel Robert).

Jones.—On August 29th at the County Hospital, Bangor, to Pearl, wife of Eric Jones, B.V.Sc., M.R.C.V.S., Bangor, twin daughters (one still-born).

Newsholme.—On September 4th, 1950, to Mary, wife of Christopher M. Newsholme, M.R.C.V.S., 1, The Drive, Chelmsford, Essex—a son (Timothy Mansford)—brother for Stephen.

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R.C.V.S. OBITUARY

Ackroyd, Edward, 4, Blackwall, Halifax, Yorks. Graduated Edinburgh, December 14th, 1926; Died September 2nd, 1950; aged 51 years.

Mr. Ackroyd succeeded his father, the late Mr. Walter Ackroyd, in the practice at Blackwall, which has been carried on there for over 60 years. He held Assistant Veterinary posts at Falmouth, Oxted (Surrey), Pontefract and Garforth, before taking over the Halifax practice. For many years he was Honorary Veterinary Surgeon at the Halifax R.S.P.C.A. clinic.

He was a member of the Hebden Bridge family who, as Ackroyd Bros., ran a horse-drawn bus service from Hebden Bridge to Todmorden and district half a century ago.

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Death.—Aston.—On September 9th, 1950, after a short illness, Ethne Mary, aged 16, only daughter of Major and Mrs. W. F. Aston, and sister of Kenneth R. Aston, M.R.C.V.S., Condover, Shrewsbury.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Cambridge.—The Nursery, Burnside, Mill Road, Cambridge (Sept. 6th).

Derbyshire.—185, Far Laund, Belper, Derby (Sept. 9th).

Isle of Ely.—Hill Farm, Finchams Farm, Littleport, Ely (Sept. 6th).

Lancs.—Bolsover House, Common Edge Lane, Marton, Blackpool (Sept. 7th); The Pig Club, Farnworth House Farm, Duxbury Chorley; Poultry Farm, Mustard Lane, Croft, Warrington, Lancs. (Sept. 8th); Fold Farm, Davyhulme, Manchester, Lancs. (Sept. 9th); Hardman Fold Farm, Failsworth, Manchester (carcase at City Abattoir, Manchester); Norbreck Hydro Farm, Norbreck, Blackpool (Sept. 4th).

Notts.—Spion Kop, Mansfield Road, Warsop (Sept. 7th); Mill Farm, East Drayton, Retford; 31, Warsop Road, Mansfield Woodhouse, Notts. (Sept. 8th); Old Hall Farm, Main Street, North Muskham, Newark (Sept. 4th); 12, Deerdale, Rufford (Sept. 6th).

Surrey.—Westland Farm, Shamley Green, Surrey (Sept. 5th).

Sussex West.—Meadow Farm, Newells Lane, Bosham, Chichester (Sept. 6th).

Yorks (W.R.).—Old Hall Piggeries, Bradley, Skipton; Whirlow Lane Farm, Sheffield, 11 (Sept. 7th); Kingwood Nurseries, Bawtrey Road, Bawtrey, Austerfield (Sept. 4th).

Sheep Scab:

Salop.—Big Huntingdon Farm, Carbomell, Ludlow, Shropshire. (Sept. 7th).

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KITTEN'S CONQUEST OF THE MATTERHORN

The Geneva Correspondent of *The Times* sent the following message to his paper on September 6th.

"A new conquest of the Matterhorn, this time by a ten-month-old black and white kitten, is reported from the Hotel Belvedere (10,820 ft.), on the Hörnli Ridge—the starting point for alpinists attempting to climb the mountain.

"The kitten, accustomed to watch from his hotel home the dawn departure of climbers, decided one morning to follow in their footsteps. He was soon left behind, but after a long and lonely climb reached the Solway hut (12,556 ft.). The next day he climbed still higher, and when night fell bivouacked in a *couloir* above the shoulder.

"The next morning he was seen by a group of climbers, who passed him by, convinced that his climbing skill, if not his spirit, would be defeated by the difficult Ropes Slabs and the Roof. They were wrong, and hours later the cat, miauling and tail up, reached the summit (14,780 ft.), where the incredulous climbing party rewarded him with a share in their meal.

"The guide, who was leading his party down the Italian side of the Matterhorn, did not want to abandon the kitten on the top of the mountain, and as cats climb up much more easily than they climb down, the guide took him in his rucksack, brought him down to the Rifugio Principe Amedeo di Savoia (12,763 ft.), and left him there until some party returning to Zermatt could take him back. He is still there, happily fattening on mice whose lofty background and immunity hitherto from feline visits have made them easy prey. A season of easy hunting seems a small reward for the first cat to cross the Matterhorn."

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INTESTINAL PARASITES OF MAN IN GREAT BRITAIN

At the recent B.M.A. meeting at Liverpool and Southport, a discussion on the above subject was opened by Professor J. J. C. Buckley, who said that about a dozen species of worms had been recorded in man in Britain, of which only half could be regarded as normal parasites, the other half being present owing to accidental infection from domestic animals. Of the common nematodes, four occurred here—the roundworm, the whipworm, the threadworm, and *Trichinella spiralis*. Infestation with the beeftape worm—*Taenia saginata*—might be on the increase since measly beef was now more prevalent than before the war; this was also the case in Denmark and elsewhere. The reasons were uncertain. The pork tapeworm—*T. solium*—disappeared from this country with the introduction of

proper meat inspection; infested pigs usually had very large numbers of cysts which were readily seen. The fish tapeworm had so far not been recorded indigenously in this country, though it occurred in Ireland.

Mr. R. B. Griffiths said that until lately infection of beef with *Cysticercus bovis* was thought to be rare in this country, but in the past two years it had become evident that the condition was now prevalent. There was no real proof that *T. saginata* infection in man had materially increased. The recognition of gross infection of a carcase with *Cysticercus bovis* entailed the condemnation of the carcase. In light infections the beef was treated by freezing, in order to kill the cysticerci before the meat was issued for consumption. Infection from undetected light infection of beef could be avoided by cooking the meat. Housewives might be infected by swallowing cysticerci adhering to the hands when preparing beef for cooking; and this might account for the fact that in women infection was four or five times as common as in men.

Dr. Napier said that in the U.S.A. the infection-rate with *Trichinella spiralis* was higher than in this country. Light infections, which were not clinically obvious, might immunise against subsequent reinfection.

Brigadier J. S. K. Boyd said it had been established that in the recent Wolverhampton outbreak of trichinellosis uncooked meat in sausages was the source. Tissue invasion by *E. histolytica* might be precipitated not only by recognised pathogenic bacilli, such as shigella, but by such organisms as *Bact. coli*, which were not invariably pathogenic.

Mr. P. L. le Roux, D.SC., M.R.C.V.S., discussed the helminthiases from the veterinary aspect, and stated that helminths might produce manifestations not solely by themselves but as agents for the introduction of various pathogenic bacteria. He thought that closer integration of human and veterinary medicine and of the public health authorities would be a powerful factor in controlling parasitic infestations.

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TESTIMONIAL ADVERTISING

Animals should mean good money, and the practical farmer is becoming increasingly careful to see that when any of it has to be laid out in medicine both agent and stock are properly "vetted." How far short the human animal falls, however, in applying the same standard to himself is well illustrated by the following item, appearing, under the above heading, in the issue of the *Pharmaceutical Journal* of August 26th:—

"American law in respect of what an advertiser may claim for a proprietary medicine is very different from ours. Under the Federal Food, Drug, and Cosmetic Act it is an offence anywhere in the United States to 'misbrand' a medicine, that is, to label or advertise the medicine in such a manner as to convey to the public 'any representation or suggestion which is inaccurate, incorrect, untrue or an erroneous statement of fact.' The aim of the Act, to quote from a recent judgment, 'is as much to prevent deception which may result from indirection and ambiguity, as from statements or representations which are false.' This judgment was delivered in a case where a manufacturer was charged with the misbranding of a device, for which, among other claims, the label stated that it had been 'tried with great success in the following diseases: arthritis, sinus, pneumonia, rheumatism, piles, varicose veins, neuritis and colds.' To further the sales of this contrivance a number of testimonials from users were incorporated in the advertising material, and several references to these were made at the trial. In his charge to the jury the learned judge said (*F.D.A. Report*, 1950, 2987); 'There was no evidence to show that the authors of the testimonials were qualified to diagnose diseases or conditions, nor that they were qualified to evaluate the results of the use of the [contrivance] on certain types of those diseases. The Government has based allegations of misbranding on some of the testimonials that are in evidence and has properly introduced evidence for your consideration, to prove its allegations of false and misleading statements. The authors of the testimonials may have been deceived as to the nature of the diseases or conditions from which they suffered or as to the effect of the use of the device.' In another report on a similar case (*Drug and Cosmetic Industry*, June, 1950) the judge commented . . . 'Any testimony, or suggestions by such lay persons that improvement or aggravation of such symptoms or conditions was brought about by the use of any particular medication or treatment should be disregarded by you since such persons are not competent or qualified to determine the cause of benefit or improvement in physical condition. . . . The proneness of lay persons to err in accrediting responsibility for benefits to health is well understood. The nature of the simplest disease is so obscure to a layman that his conclusions touching what will benefit it and not benefit it mean little.'

"When the [Pharmaceutical] Society sent its memorandum on proprietary medicines to the Minister of Health in 1947 the subject of testimonial advertising was dismissed in the briefest terms: 'Reliance is placed upon uncritical testimonials as evidence of the value of proprietary medicines.' That was three years ago; there may since have been a slight easing off in this form of advertising, but some manufacturers are still using it. Sooner or later an enlightened Government is bound to rule such advertising out of order and there can be little doubt that responsible public opinion would support such action. . . . Last week, at an inquest in a North of England town, a pathologist is reported to have said that the deceased, a 61-year-old man, had died from alkalosis caused by excessive intake of alkali medicines, and his wife, in evidence, stated that her husband had consumed as much as two boxes of 'stomach powder' a day. It is perhaps relevant to ask whether this unfortunate person was persuaded to start taking the powder as a result of studying 'testimonial' advertising."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

"ANAVENOL": A SHORT-ACTING ANAESTHETIC FOR THE HORSE

Sir,—Perhaps I may be allowed to add to the letter from Mr. J. Pickup which you published last week (*Vet. Rec.* **62.** 526). The occasion of the demonstration to which he refers was the meeting of the Society of Women Veterinary Surgeons in London on May 27th, when Mr. Pickup undertook very kindly to carry out the actual castration, while I administered the anaesthetic and provided a commentary on the state of the patient. The colt went down with an unusually small dose of the drug (28 mg. of β-naphthoxyethanol per kg.) and the depth of anaesthesia was correspondingly light. As Mr. Pickup points out, a further dose of "Anavenol" was necessary to attain a depth of anaesthesia such that *no visible motor reaction* should follow the crushing of the cord. I was explaining this point to the audience before continuing the injection, for which I understood the surgeon was waiting, when I found that Mr. Pickup, quite rightly from the surgeon's point of view, had completed the operation successfully. I had thus no occasion to induce a deeper plane of anaesthesia.

I think this happening may be attributed more fairly to "poor staff-work" between Mr. Pickup and myself—it was the first occasion on which he and I had worked in "double-harness"—than to defects inherent in "Anavenol." It is not always easy to carry out a surgical anaesthesia oneself and to explain at the same time to an audience what is happening, especially during very short operations.

I would add that this case was not included in the series I reported in my paper (*Vet. Rec.* **62.** 500), in which my main thesis was that the results obtained with "Anavenol" in the horse were sufficiently encouraging to warrant extended clinical evaluation. After all, chloral hydrate was introduced as an intravenous equine anaesthetic in 1870, but it is only in recent years that it has been used widely in this country. The full evaluation of a new equine anaesthetic is necessarily a slow procedure, to which the experience of many clinicians with a long series of cases must contribute. Until this wider experience regarding the correct indications for, and best methods of using a new drug has been built up, it is perhaps unwise to attach too much importance to observations made on a single case.

Yours faithfully,

Animal Health Trust, H. B. Parry.
Newmarket,
September 5th, 1950.

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Sir,—Mr. Frank Chambers, in his article on "Animal Diseases Inimical to Man" (*The Veterinary Record*, September 2nd, 1950), mentions briefly some clinical signs of leptospirosis in the dog. No differentiation is made between signs caused by *L. icterohaemorrhagiae* and those caused by *L. canicola*, and an uninformed reader might gain the wrong impressions that *L. canicola* is probably transmitted by the rat and the illness it causes in dogs is characterised in many cases by acute gastro-enteritis or jaundice, whereas *L. canicola* is only known to occur naturally in the dog and man, and gastro-enteritis and jaundice are rarely features of the canine disease, which is principally a nephritis.

Yours faithfully,

Small-Animal Clinic, Ian M. Lauder, M.R.C.V.S.
University of Glasgow Veterinary School.
September 9th, 1950.